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Characteristics of long-acting reversible contraception users presenting to a pediatric emergency department

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CHARACTERISTICS OF LONG-ACTING REVERSIBLE CONTRACEPTION USERS PRESENTING TO A PEDIATRIC EMERGENCY DEPARTMENT

by

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ABSTRACT

Background: One in ten sexually active adolescents in the United States become pregnant each year. Significant differences in unintended pregnancy and use of long-acting reversible contraceptive (LARC) methods: the sub-dermal implant, the copper intrauterine device (IUD) and hormonal IUDs, exist between socioeconomic strata as well as ethnic and racial groups. Women using LARC are 20 times less likely to experience a pregnancy than women using short-acting reversible methods. Thus, LARCs present a major opportunity for the prevention of unintended pregnancy.

Purpose: Characterize contraceptive use, demographics, and behavioral characteristics of a novel population: young women presenting to an urban Pediatric Emergency Department (PED) in order to better understand the contraceptive needs of this population.

Methods: We characterized the current LARC usage. Using an anonymous paper-based questionnaire, we surveyed women ages 16-21 years regardless of chief complaint presenting to our PED regarding their demographics, health care access, sexual history, and history of contraceptive use. We conducted a cross-sectional analysis of demographic characteristics for current LARC and non-LARC users (n=331) using chi-squared for categorical variables and student's t-test for continuous variables.

Results: No significant differences were found between women currently using LARC and those not using LARC, however current LARC usage in our population was 15.8%, about three times that documented in the most recent national studies conducted in 2013. **Conclusion**: Current LARC use is particularly high in our urban PED setting. More research is necessary to determine if this is part of a larger national trend or if the early implementation of no-cost contraception in Massachusetts and changes in provider or patient attitudes towards LARC may explain the large observed difference in LARC usage.

Key words: contraceptive implant, intrauterine device, long-acting reversible contraception, pediatric emergency department, adolescent

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LIST OF ABBREVIATIONS

AAFP ..... American Academy of Family Physicians

AAP ..... American Academy of Pediatrics

ACA .....Affordable Care Act

ACOG .....American Congress of Obstetricians and Gynecologists

BMC ..... Boston Medical Center

BUMC .....Boston University Medical Campus

CDC .....Centers for Disease Control and Prevention

DMPA .....Depot medroxyprogesterone acetate, "the shot"

ED ..... Emergency department

GED ..... General educational development test

IUD ..... Intrauterine device

.....(unless otherwise mentioned refers to all formulations of hormonal and copper IUDs)

LARC ..... Long-acting reversible contraception

NSFG .....National Survey of Family Growth

OCP.....Oral contraceptive pill

..... (this includes both combined pills and progestin-only pills unless otherwise stated)

PCP ..... Primary care provider

PED .....Pediatric emergency department

PID ..... Pelvic inflammatory disease

PRI ..... Pregnancy Risk Index

SARC ..... Short-acting reversible contraception

SIECUS ..... Sexuality Information and Education Council of the United States

STI ..... Sexually transmitted infection

UN ..... United Nations

YRBSS ..... Youth Risk Behavior Surveillance System

INTRODUCTION

Unintended pregnancy remains an issue of significant concern in the United States. Of sexually active U.S. adolescent females, more than 1 in 10 become pregnant each year (Kost & Henshaw, 2014). Over the last two decades, adolescents have waited longer until first sexual intercourse and rates of condom and oral contraceptive pill (OCP) usage at last intercourse have improved modestly, but the rate of teen pregnancy in the U.S. remains 2-10 times the rates of other economically similar nations (Kann et al., 2014; Singh & Darroch, 2000). Within the U.S. there are significant racial differences with Black women experiencing an unintended pregnancy rate almost 200% higher and Hispanic women with a rate about 170% higher than White women (Kost & Henshaw, 2014).

Part of the disparity in teenage pregnancy between the U.S. and economically similar European nations may be accounted for by the lower rate of contraception use by U.S. adolescents, both in terms of short-acting reversible contraception (SARC) and long-acting reversible contraception (LARC). SARC methods as defined by the American Congress of Obstetricians and Gynecologists (ACOG) include condoms, OCPs, contraceptive patches, vaginal rings, and the depot medroxyprogesterone (DMPA) shot, while long-acting methods include intrauterine devices (IUDs), copper and hormonal, and sub-dermal implants (American Congress of Obstetricians and Gynecologists, 2012). Of school enrolled U.S. adolescent females, 22.4% reported use of OCPs for contraception at last intercourse compared to 55% of 15 year-old females in Germany, 32% in Canada,

and 23% in England (Currie, Gabhainn, & Godeau, 2008; Kann et al., 2014). U.S. women use IUDs at less than half of the rate of Northern and Western European women (UN Department of Economic and Social Affairs, Population Division, 2011). The form of birth control used is of crucial importance as risk of pregnancy was measured at 16-20 times higher for women using SARC as compared to those using a long-acting method (Winner et al., 2012). Additionally, failure rates in the U.S. and Canada for oral contraceptive pills and for vaginal rings are higher than in Europe, likely due to differences in compliance (Mansour, Inki, & Gemzell-Danielsson, 2010). Increased access to LARC could help to prevent unintended pregnancies and close the gap between ethnic, racial, and socioeconomic groups within the U.S. as well as the gap between the U.S. and its European counterparts.

BACKGROUND

Adolescent Sexual Behavior

In the U.S., the average age at first intercourse for women is 17.1 years with 27% of 15-17 year-old females and 62.7% of 18-19 year-old females reporting they have ever had intercourse (CDC, 2013). Rates of adolescent sexual intercourse are slightly higher in African American females and Hispanic females, 53.4% and 46.9% respectively, as compared to 45.3% of white females (Kann et al., 2014). Though adolescents have continued to delay sexual initiation and use protection at higher rates over the past two decades, with 85.6% of adolescent females now reporting use of contraception at last intercourse compared to 79.9% in 1988, usage rates and reports of risk behavior have stagnated during the two most recent years of data (CDC, 2011).

Social factors modify adolescent sexual behavior and may impact subsequent health outcomes. Lower socioeconomic status contributes to risk of earlier sexual initiation (O'Donnell, O'Donnell, & Stueve, 2001). Family structure differing from two biological parents has been documented as a significant factor in earlier sexual initiation, however it does not significantly impact lifetime risk of sexually transmitted infection (STI), concurrent sexual partners, or exchange of sex for money during the last year (O'Donnell et al., 2001; Haydon, Herring, & Halpern, 2012). Obesity is also a risk factor in some groups, particularly White females where it increases the likelihood of having multiple sexual partners and decreases likelihood of condom usage (Leech & Dias, 2012). Early initiators, defined as those with a sexual debut at less than 15 years, are more likely

to report multiple sexual partners, pregnancy, and forced intercourse (Magnusson, Masho, & Lapane, 2012; O'Donnell et al., 2001). The educational prospects of early sexual initiators, with a sexual debut prior to age 15, tend to be the most heavily impacted; they are significantly less likely to graduate from high school, enroll in college, and graduate from college, even sexual initiation before age 18 has also been associated with reduced odds of post-secondary education (Spriggs & Halpern, 2008; Steward, Farkas, & Bingenheimer, 2009).

Certain characteristics and behaviors may serve as protective factors that may delay sexual initiation and increase the likelihood that condoms will be used at first sexual intercourse. In a systematic review of the effects of spirituality and social norms on adolescent sexual health, subjective sexual norms (the attitudes, beliefs, or values of survey participants towards sex), perceived sexual norms (the participants' perception of the norms of others), and religiosity (attendance at services and importance of spirituality) were found to be protective of ever having had sex, use of condom, and intention to have sex (House, Mueller, Reininger, Brown, & Markham, 2010). Factors previously thought of as protective, such as college aspirations, may not actually mediate likelihood of sexual initiation or unprotected sexual activity, though one study found a significant difference in recent sexual activity between low and high aspiring students (Cubbin, Brindis, Jain, Santelli, & Braveman, 2010; Kirk, Lewis, Lee, & Stowell, 2011). Pledges of virginity have not been found to be effective at delaying onset of sexual activity or to have an effect on STI history and adolescent women who pledge virginity are less likely to report birth control usage at last sex (Rosenbaum, 2009).

Adolescent Pregnancy

The United States unintended pregnancy rate is 147 per 1,000 in sexually active women 15-17 years of age and 162 per 1,000 in sexually active women aged 18-19, significantly higher than in similarly developed nations (Finer, 2010; Singh & Darroch, 2000). Women with a mother or sister who has experienced teenage pregnancy are significantly more likely to experience teenage pregnancy themselves (East, Reyes, & Horn, 2007; Magnusson, Masho, & Lapane, 2011). Across all races and ethnicities, early menarche significantly increases the probability that an adolescent will experience pregnancy (Dunbar, Sheeder, Lezotte, Dabelea, & Stevens-Simon, 2008). Additionally, low socioeconomic status, Black race or Latina ethnicity are also associated with unintended pregnancy (Gillespie, Ahmed, Tsui, & Radloff, 2007; Magnusson et al., 2011). Homeless youth constitute an especially vulnerable population with regards to adolescent pregnancy with reported rates ten times the national average (Winetrobe et al., 2013; Kost & Henshaw, 2014).

Barriers to the reduction of adolescent pregnancy may be largely attitudinal: ambivalence to pregnancy has been documented as high as 30% in urban females and odds of ambivalence increase with reported depression (Chernick, Kharbanda, Santelli, & Dayan, 2012; Francis, Malbon, Braun-Courville, Lourdes, & Santelli, 2014). Other attitudes such as low self-worth and hopelessness are also associated with attempted pregnancy (Fedorowicz, Hellerstedt, Schreiner, & Bolland, 2014).

Though overall teen pregnancy and birthrates have decreased in recent years, initiatives focused on pregnancy reduction can continue to build on these successes. The

National Initiative to Prevent Teen Pregnancy successfully reduced teen pregnancy by a third during the decade after its founding in 1996; the initiative now has been expanded to focus on *unintended* pregnancy as there have not been significant gains in this area (National Campaign to Prevent Teen Pregnancy, 2015). Other initiatives, such as The President's Teen Pregnancy Prevention Initiative, focus on communities with the highest rates of adolescent pregnancy with the aim to reduce teen birth rates by 10%, delay first sex, increase the use of effective means of contraception, and reduce the overall teen pregnancy rate (SIECUS, 2012). In addition to initiatives explicitly focused on pregnancy prevention, initiatives that focus on early childhood education and youth development in the form of academic support, after school programs, and community service also show promise for the reduction of adolescent pregnancy; a recent systematic review found a pooled 39% reduction (Harden, Brunton, Fletcher, & Oakley, 2009).

Adolescent Contraception

General Use

Overall, American adolescent female contraception usage has improved from 79.9% in 1988 to 85.6% today (Centers for Disease Control and Prevention (CDC), 2011). The overall rate is comparable with available data for Canada, England, and France whose rates were 82.3, 82.8, and 89.5 respectively (Godeau et al., 2008). However, use of contraception at last intercourse still varies considerably depending on race and ethnicity: 89.3% of non-Hispanic white adolescent females reported using some method of contraception at last intercourse while only 81.1% of non-Hispanic Blacks and 79.5% of

Hispanic/Latinas reported doing so (CDC, 2011). Even of those women using contraception, 23% of U.S. women experience relatively high risk of pregnancy due to inconsistent use (Frost, Singh, & Finer, 2007). Additionally, early sexual debut increases the odds of gaps in the use of contraception by two times compared to women who debuted at 18 years of age or later and increases likelihood of nonuse at most recent intercourse (Magnusson et al., 2011, 2012; Cavazos-Rehg et al., 2010). Family conflict is also associated with not using contraception at last intercourse and an increased number of sexual partners (Lyerly & Brunner Huber, 2013). Though ambivalence to pregnancy contributes to a woman's odds of pregnancy, women with high levels of ambivalence have not been found to differ in contraceptive use from non-ambivalent women (Yoo, Guzzo, & Hayford, 2014)**.** As with pregnancy, attitudinal factors play a significant role in use of contraception: in a worldwide systematic review of qualitative studies, authors found a number of universal themes in adolescent beliefs regarding sexual behavior. Themes included: condoms are stigmatizing and indicate lack of trust, partners and societal norms influence behavior, adolescents tend to assess their partners as "clean" or "dirty", and social norms may hinder communication about sex (Marston & King, 2006). These attitudinal factors may help to explain low usage of birth control methods among adolescents despite a high degree of knowledge.

Adolescent Knowledge of contraception

Condoms and OCPs are the most common forms of contraception in the adolescent population, however this may not constitute a preference, but a lack of

knowledge regarding other types of contraception as women are unlikely to choose a method with which they are unfamiliar (CDC, 2011; Spies, Askelson, Gelman, & Losch, 2010). Though most adolescents have heard of OCPs and condoms, misconceptions persist, even among OCP users (Craig, Dehlendorf, Borrero, Harper, & Rocca, 2014; Hamani et al., 2007). However, increased knowledge of oral contraceptives was associated with significantly higher 6 month continuation rates (Hall, Castaño, & Westhoff, 2014). Lesser known methods of SARC, such as the ring and the patch, benefit particularly from provider counseling, which is associated with higher rates of women choosing these methods (Harper, Brown, Foster-Rosales, & Raine, 2010). Hispanic women are considerably less likely to have heard of the patch, the ring, and IUDs while Black women were less likely to have heard of the ring (Craig et al., 2014).

Differences in awareness about contraceptive methods remain: 87% of adolescents have heard of IUDs and only 52% have heard of implants, as opposed to near 100% awareness of OCPs and condoms (Craig et al., 2014). Women are frequently misinformed about IUDs and are unaware that nulliparous women are eligible to use them, though this may in part be due to the fact the most popular form of hormonal IUD, Mirena®, is not labeled for use in nulliparous women in the U.S. (Craig et al., 2014; Finer, Jerman, & Kavanaugh, 2012). Younger women and non-native English speakers were significantly less likely to have heard of LARC and have low level knowledge of LARC methods (Craig et al., 2014; A. R. Dempsey, Billingsley, Savage, & Korte, 2012; Sokkary et al., 2013). Nulliparous women are initially less likely to be interested in an IUD, but are more likely to consider an IUD after provider counseling (Fleming, Sokoloff,

& Raine, 2010). The largest prospective observational study to date, which offered counseling followed by a choice of all reversible types of contraception, shows that improved knowledge about LARC leads to increased use and acceptability in the adolescent and young adult population (Mestad et al., 2011). Overall, 70% of participants chose a LARC method. A significant majority of 14-17 year-olds preferred the implant while a significant majority of 18-20 year-olds chose hormonal or copper IUDs (Mestad et al., 2011). Despite the generally high awareness of SARC, continued emphasis should be placed on increasing knowledge of *all* forms of contraception to increase uptake and continuation rates among adolescents and young adults.

Adolescent Usage of Contraception

Nearly sixty percent of sexually active school-attending adolescents reported they or their partner used a condom at last intercourse to prevent pregnancy, 19% reported OCP use, and 1.6% reported IUD or implant use (Kann et al., 2014). Overall, these usage rates still fall behind most European nations (United Nations, 2011). Racial differences in LARC usage vary for adolescents as compared to young adults; adolescent Black women are significantly less likely to use LARC than their white counterparts, while among young adults, Asian women are the only group significantly less likely to use a LARC method (Dehlendorf et al., 2014; Dempsey et al., 2012). The disparity in contraceptive usage rates between white women and women of color has broadened in recent years (Dehlendorf et al., 2014; Jacobs & Stanfors, 2013). Parous women are considerably more likely to use an IUD than nulliparous women (Whitaker, Sisco, Tomlinson, Dude, &

Martins, 2013; Xu et al., 2011). Predictive factors for current LARC usage in young women (18-29 years of age) include higher age, earlier onset of sexual activity, less than four sexual partners in the last year, and higher education level of the mother of the user (A. R. Dempsey et al., 2012; Xu et al., 2011). Women with previous history of discrimination are more likely to use SARC, but when barriers to contraception were removed, women tend to choose LARC (Kossler et al., 2011). Research regarding the indication for LARC usage in the adolescent female population is also lacking. In a review of clinical trials and observational studies examining female contraceptives, studies that examined LARC methods were significantly less likely to recruit nulliparous females than trials examining OCPs, instead limiting recruitment to white women of more advanced age (Mansour et al., 2010).

Adolescent beliefs regarding bleeding patterns may also influence contraceptive choice. Adolescent women noted irregular bleeding as a common concern, especially the disruption of menses as it was frequently seen as a process necessary for the "cleansing" of the body or otherwise in opposition to cultural beliefs (Clark, Barnes-Harper, Ginsburg, Holmes, & Schwarz, 2006; Kavanaugh, Frohwirth, Jerman, Popkin, & Ethier, 2013). Changes in menstruation also caused the adolescents to doubt the effectiveness of the contraceptive method (Clark et al., 2006).

Adolescent Primary Care Utilization

Overall, 16-20% of adolescent girls lack access to primary care and are more likely to report no regular source of health care as compared to children (McKee & Fletcher, 2006; Schoen, Davis, & Scott Collins, 1997; Burns & Leininger, 2012). Minority adolescent females, particularly Asian adolescents, are less likely to have a usual source of care as are women born outside the mainland U.S., those with lower maternal education, and those who are not sexually active (McKee & Fletcher, 2006; Schoen et al., 1997). Of females with access to primary care, the primary care setting also differed by race: Black and Hispanic females disproportionately access hospital outpatient clinics as their source of primary care, while white females disproportionately access non-hospital based physicians' offices for their primary care (Hoover, Tao, Berman, & Kent, 2010).

Younger girls tend to see pediatricians for their primary care, but by 17-18 years of age, women are significantly more likely to see an OB/GYN (Hoover et al., 2010). Privately insured and Medicaid covered adolescent females alike are likely to go multiple years without a preventive care visit, but do access primary care for problem focused visits more than once per year (Nordin, Solberg, & Parker, 2010; Dempsey & Freed, 2010). Even when girls access primary care, their needs are not met; although two thirds of adolescent girls surveyed said that doctors should discuss sensitive issues such as pregnancy prevention, less than a quarter reported discussing these types of topics (Schoen et al., 1997).

Adolescents and young adults more frequently access the emergency department (ED) in place of a primary care provider (PCP) for non-urgent health care needs as compared to children and older adults (Uscher-Pines, Pines, Kellermann, Gillen, & Mehrotra, 2013; Ziv, Boulet, & Slap, 1998). Nationally, African Americans, females, and 18-21 year-olds account for a disproportionately high amount of ED usage compared to their proportion of the total population (Ziv et al., 1998). Adolescents who use the ED as their usual source of care were more likely to report missed care and fewer regular preventive health visits (Wilson & Klein, 2000). Higher risk groups of adolescents such as those reporting high risk behaviors and clinical history significant for depression and sexual abuse were are all more likely to use the ED as their usual source of care (Wilson & Klein, 2000). Non-urgent patients express a variety of reasons for accessing emergency services including: urgent need to seek medical attention, referral by PCP, and shorter wait times (Weiss, D'Angelo, & Rucker, 2014). A substantial portion of women presenting to the PED feel it is an acceptable place to receive contraception or related information, with the majority of women preferring a location such as the PED over their physician's office (Todd, Plantinga, & Lichenstein, 2005). Women who would prefer to receive contraception or related information in a setting other than their physician's office are significantly more likely to be uninsured and lack a PCP (Todd et al., 2005).

Clinical Recommendations and Provider Attitudes

In the past, providers were not amenable to prescribing LARC methods to adolescents; however, with recent revisions in the professional recommendations of the ACOG, American Academy of Pediatrics (AAP) and American Academy of Family Physicians (AAFP), these beliefs are slowly changing. ACOG came forward in 2012 with the first and the strongest worded opinion indicating that LARC should "be first-line recommendations for all women and adolescents", though the AAFP and most recently the AAP have approved similar recommendations (American Congress of Obstetricians and Gynecologists, 2012; Randel, 2012; American Academy of Pediatrics, 2014). In keeping with these changes, physicians with training in OB/GYN or family medicine are significantly more likely to prescribe LARC than their pediatric or internal medicine trained counterparts (Greenberg, Makino, & Coles, 2013). More providers consider IUDs and implants safe for adolescents than in previous years; however many providers still fail to discusses these options with as many as half of their patients (Biggs, Harper, Malvin, & Brindis, 2014; Kavanaugh, Jerman, Ethier, & Moskosky, 2013; Wellings, Zhihong, Krentel, Barrett, & Glasier, 2007). Providers are more likely to discuss these options at facilities where staff had received training on delivery of contraception to adolescents and with patients of older age (Kavanaugh, Jerman, et al., 2013). Providers tend to be more reluctant to discuss IUD provision when the provider sees the patient as promiscuous or who puts herself at undue risk for STIs (Rubin, Campos, & Markens, 2013). Additionally, providers tend to have unfounded concerns, such as that methods will cause infertility, will have higher rates of non-compliance than other methods, or that

nulliparous women are not good candidates for the method (Kavanaugh, Jerman, et al., 2013; Madden, Allsworth, Hladky, Secura, & Peipert, 2010; Swanson, Gossett, & Fournier, 2013) Many providers also express concerns about experience in inserting implants and most frequently, concern about the cost of both IUDs and implants to the clinic and to the patient (Kavanaugh, Jerman, et al., 2013). Though cost concerns have disappeared for many patients under the Affordable Care Act (ACA), many private insurers are denying certain methods of birth control such as the patch and the ring arguing that these are not distinct methods as they use the same hormone levels found in OCPs (Sonfield, 2013). Obtaining contraception may be especially difficult for immigrant women as those who have not had legal residence for 5 years are unable to qualify for Medicaid (National Latina Institute for Reproductive Health, 2010). Physician knowledge, willingness to prescribe, and cost all may impede wider adoption of LARC in the adolescent population.

Types of LARC Currently Available

The Implant

Nexplanon®, "the implant", is a 4 cm long cylindrical implant that is placed under the skin of the upper arm providing a continuous release of etonogestrel 68mg for three years (Merck, 2011). The failure rate is extremely low, less than one pregnancy per 100 women in one year, but greater than 10% of women experience irregular bleeding, with the majority of women experiencing fewer than average days of bleeding, but some

experiencing more (Mansour, Bahamondes, Critchley, Darney, & Fraser, 2011; Merck, 2011). The 24 month discontinuation rate in trials conducted both in the U.S. and abroad ranges from 27-75%, with the most common reason due to irregular bleeding (Arribas-Mir et al., 2009; Harvey, Seib, & Lucke, 2009; Lakha & Glasier, 2006; O'Neil-Callahan, Peipert, Zhao, Madden, & Secura, 2013). Many women express that they were not adequately warned of all side effects prior to initiation of the implant, thus side-effect counseling particularly regarding bleeding patterns is extremely important and in some studies has led to improved rates of continuation (Davie et al., 1996; Hoggart, Louise Newton, & Dickson, 2013). However, in other settings, more "intensive" counseling has had no effect (Modesto, Bahamondes, & Bahamondes, 2014). Latina, Black, White and Asian women differ in their belief that it is necessary to have a period every month with ethnic and cultural factors possibly accounting for some of the differences (Andrist et al., 2004; Mansour et al., 2011). Black women and Hispanic women were more likely to hold this belief as compared to White women which may partially account of lower usage of LARC among Black and Hispanic women (Andrist et al., 2004; Zheng, Zheng, Qian, Sang, & Kaper, 1999). As the implant is the only externally visible form of LARC, some women note concerns of privacy as it may be visible under the skin, but others report that their male partners find its appearance reassuring (Meirik, Fraser, d' Arcangues, & WHO Consultation on Implantable Contraceptives for Women, 2003). Indonesians and Ethiopians may insert objects or herbs under the skin for beautification or medicinal purposes thus adoption of the implant may be increased in these cultures (Meirik et al., 2003)

In addition to the low failure rate and the length of duration of action, the implant has other advantages, particularly regarding its insertion. The implant is more likely to be placed before an adolescent mother resumes sexual intercourse as compared to the IUD, likely due to recommendations regarding IUD placement that dictate that placement should occur within 48 hours of birth or after four weeks (Tocce, Sheeder, Python, & Teal, 2012). Implants are also advantageous over IUDs in that they can be placed after any abortion, not just abortions that occur in the first or second trimester (American Congress of Obstetricians and Gynecologists, 2012). Implants also have the potential to be administered by a wider number of specialists and generalists as they require considerably less extensive training than IUDs (Potter, Koyama, & Coles, 2015).

The IUD

Three types of intrauterine devices are currently available in the United States: the ParaGard® copper IUD, the Mirena® IUD (a levonorgestrel-releasing form), and most recently the Skyla® low-dose levonorgestrel-releasing IUD (Prescott & Matthews, 2014). A fourth type of IUD, marketed as GyneFix®, a frameless copper IUD, does not differ significantly from the conventional framed IUD in any of the characteristics measured (O'Brien & Marfleet, 2005). All methods are very effective with less than one percent of women experiencing pregnancy with one year of use and are also readily reversible with 70% of women able to conceive in the year after removal (Prescott & Matthews, 2014). Adolescents and young women discontinue IUD use for a spectrum of reasons including

pain, bleeding, infection, expulsion, pregnancy desire, and partner sensation of strings (Lara-Torre, Spotswood, Correia, & Weiss, 2011; Teal & Sheeder, 2012). The twelve month discontinuation rate for adolescent women is significantly higher than women over 25 years of age, with estimates ranging from 23-45% (Aoun et al., 2014; Teal & Sheeder, 2012). Rates of expulsion, contraceptive failure, and discontinuation at 12 months are all significantly increased with the copper IUD compared to the hormonal (Aoun et al., 2014).

An IUD is advantageous in that it may be inserted same day post abortion, however, this leads to significantly higher expulsion rates compared to delayed insertion (Okusanya, Oduwole, & Effa, 2014). IUDs are also effective for other uses than routine contraception: the copper IUD is the most effective form of emergency contraception and hormonal IUDs are the most effective minimally invasive treatment of menorrhagia (Koyama, Hagopian, & Linden, 2013; Turok et al., 2013; American Academy of Pediatrics, 2014; Qiu, Cheng, Wang, & Hua, 2014).

Injectable

Medroxyprogesterone acetate, Depo-Provera®, "the shot", is considered a form of LARC by the National Institute of Health Care Excellence in the UK since it is a means of contraception that is administered less than once a month, but is not included by major physician groups in the United States (American Congress of Obstetricians and Gynecologists, 2012; Randel, 2012; National Collaborating Centre for Women's and Children's Health (UK), 2005). Medroxyprogesterone acetate is administered by a health

professional as an intramuscular injection every 3 months (Pfizer, 2010). Part of the controversy over the long or short-acting classification of this method is borne out by the large difference between typical use and perfect use pregnancy rates: with typical use the 1 year pregnancy rate is 3%, but with perfect use this rate is only 0.3% and is comparable to the implant and all types of IUD (Curtis, 2010). Additionally, the shot is not currently recommended as method of contraception for greater than two years due to its risk of bone mineralization loss (Curtis, 2010). Depo-Provera® has the highest 12 and 24 month discontinuation rate of all hormonal methods of contraception, a relationship that is not significantly altered by allowing user self-injection (Curtis, 2010; O'Neil-Callahan, Peipert, Zhao, Madden, & Secura, 2013; Cameron, Glasier, & Johnstone, 2012). The most common reason for discontinuation is irregular bleeding followed by breast tenderness and weight gain (Drey & Darney, 2002). The shot is not as readily reversible as other methods of contraception as ovulation resumes on average 200 days after the last shot (Drey & Darney, 2002). Despite these side effects, medroxyprogesterone injection is especially useful in certain patient populations such as epileptics and sickle cell patients as it has been shown to reduce seizures and decrease hemolytic crisis (Drey & Darney, 2002).

Advantages of LARC

Overall, LARC methods are seen as the preferred contraceptive for the adolescent population by providers, but are not yet the method of choice among patients. Providers and patients agree that the "forgettable" nature of this method of contraception is an

important advantage and that possibility of painful insertion and removal is a major disadvantage (Figure 1) (Kavanaugh, Frohwirth, et al., 2013). However, providers do not tend to share the patient's chief concern, having a foreign object in her body, which may be a major barrier to adolescent uptake of LARCs (Kavanaugh, Frohwirth, et al., 2013). LARC's may help to lessen the female's burden of responsibility of contraception, as many women feel that this responsibility is not shared by their partner (Hodgson, Collier, Hayes, Curry, & Fraenkel, 2013).

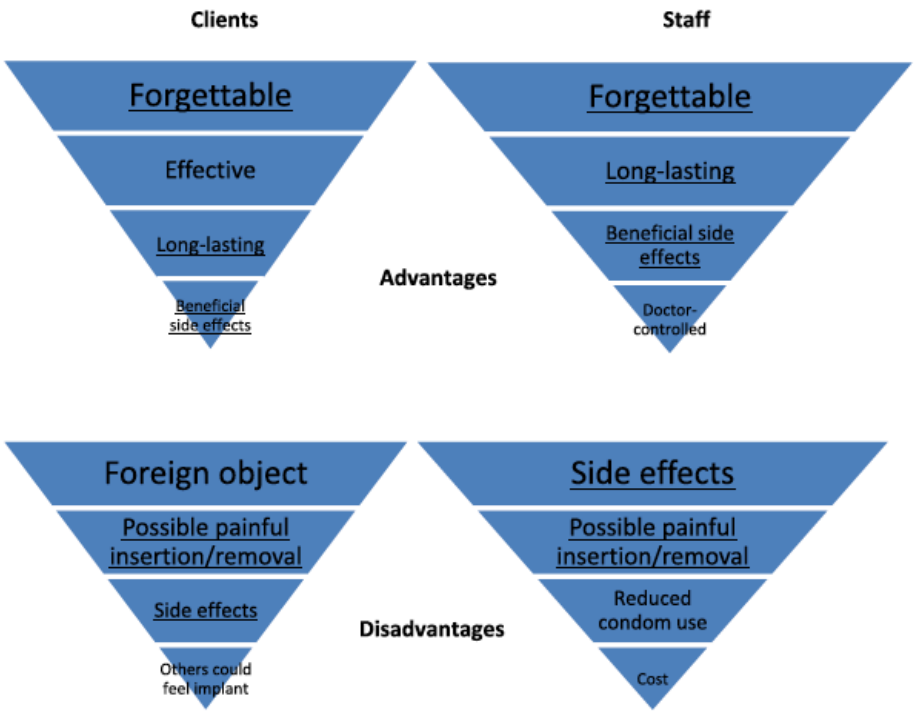

Figure 1: Provider and Patient Concerns about LARC from Kavanaugh, Frohwirth, et al., 2013.

History of LARC and Women of Color

Though all major physician professional groups have issued resolutions in support of LARC use in adolescents, we should proceed with awareness of the history of one form of LARC, Norplant®, in communities of color. In the early 1990's, Norplant®, the six-rod original formulation of the sub-dermal implant, was suggested by American political groups as a method for sterilizing women on Welfare (Thompson, 1996; Roberts, 1998). Allegations of providers refusing LARC removal have also surfaced, as have assertions of providers specifically administering the device to women with "social problems" (Thompson, 1996). Indeed, Black and Native American women have historically used Norplant® at rates much higher than their White and Asian counterparts (Malat, 2000). In administering LARCs, providers should take care to preserve female autonomy and ensure that removal is readily available when desired by the patient.

Study Setting

The state of Massachusetts has among the lowest teenage pregnancy and birth rates in the nation and has seen considerable declines in adolescent pregnancy, birth, and abortion rates since state data was first recorded in 1988 (Kost & Henshaw, 2014). However, the overall statistics mask considerable inequality: the Hispanic birthrate is more than four times and the birthrate for Blacks is nearly three times the birthrate for non-Hispanic Whites (Kost & Henshaw, 2014).

A third of Black and Hispanic females presenting to a New York City urban PED were currently pregnant or at significant risk of pregnancy over the next year according to a calculated Pregnancy Risk Index (PRI) based on the efficacy of a woman's

contraceptive method assuming typical use (Chernick et al., 2012). About a quarter of women seen in this ED were amenable to hearing about contraception during their visit; women with a higher PRI were more amenable to receiving information (Chernick et al., 2012).

Summary

In sum, many characteristics such as race and ethnicity, as well as social, behavioral, and biological factors affect the sexual behavior, pregnancy, and contraception practices of adolescents. U.S. adolescents now wait longer until first sexual intercourse, though additional factors such as family structure, body weight, social norms, spirituality, and educational aspirations all modify sexual behavior. In overall sexual behavior U.S. adolescents do not significantly differ from other similarly developed nations, but the adolescent pregnancy rate remains significantly higher. Differences in contraceptive usage may play a role as U.S. women use both LARC and SARC methods of contraception at a lower rate than women in Northern and Western Europe. Social factors such as ambivalence to pregnancy, mother or sister who experienced adolescent pregnancy, and homelessness as well as biological factors such as early menarche contribute to elevated risk of adolescent pregnancy. Americans also differ from other similarly developed nations in their contraceptive choice; overall use rates are similar but American adolescent women tend to favor short acting methods which carry with them a higher risk of pregnancy as compared to extremely low risk LARCs. Factors such as knowledge about LARC, early sexual debut, family conflict, partner norms, and history of discrimination have been documented as influencing this choice. Improved patient knowledge about LARC leads to increased use, increased satisfaction, and lower rates of discontinuation. Previous research indicates that women are amenable to discussing LARC in the ED. Young women frequently lack access to primary care, which helps to

explain the disproportionately high rates of ED usage for African Americans and 18-21 year olds as well as those with history of depression and sexual abuse.

Previously, providers were reluctant to administer LARCs to adolescent females, but in the past three years all the professional organizations of the physicians most likely to administer LARCs to adolescents (ACOG, AAP, and AAFP) have endorsed the use of LARCs as first-line contraceptives for sexually active women. Despite the changes in recommendations, misconceptions remain common and many physicians report that they are uncomfortable with LARC administration procedures. Advantages perceived by providers do not perfectly match the concerns of patients, though both agree that the fact that LARCs are forgettable, long-lasting, and have beneficial side effects are major selling points.

The previous literature identifies a need to better characterize women presenting to urban PEDs and their current contraceptive use as these women may come from some of the groups most vulnerable to unintended teenage pregnancy and may otherwise lack a means of obtaining a LARC method.

SPECIFIC AIMS

Aim 1: Describe characteristics of young women presenting to an urban PED who currently use a LARC method.

Hypotheses: We predict that users of long-acting methods presenting to an urban PED will have similar characteristics as women presenting to family planning clinics and women included in large national surveys.

Methods: We will compute descriptive statistics for LARC users, non-LARC users, and total population.

Aim 2: Compare current LARC users and current non-LARC users presenting to an urban PED.

Hypothesis: We predict that women who use LARC will be older, have higher gravidity, increased parental education, increased history of STI, and decreased level of education.

Methods: We will use chi-square tests to compare categorical variables (race, ethnicity, parental education, educational aspirations, primary care usage, and STI history) and t-tests to compare continuous variables (age and gravidity). We will also compute odds ratios.

METHODS

Study Design

We conducted a cross-sectional anonymous paper-based questionnaire study in an urban PED in Boston, Massachusetts. This study, which aimed to characterize the demographic and behavioral characteristics of current LARC users presenting to the PED, is a subset of a larger study aiming to characterize contraceptive use and preferences in order to improve contraceptive options in the PED. LARC methods include the levonorgestrel IUDs, the copper IUD, and the subdermal implant. Non-LARC methods include all other types of contraception and women not currently using a contraceptive method. The study was approved by the Institutional Review Board of Boston University Medical Campus (BUMC) and granted a Waiver of Requirement for Documentation of Consent.

Study Population

The PED at Boston Medical Center (BMC) serves an ethnically and racially diverse population of almost 27,000 patients per year. Inclusion criteria were such that all English-speaking females 16-21 years of age regardless of chief complaint presenting to the PED during a survey block period were approached regarding study participation. Women with high acuity complaints, who were medically comprised, or those with intellectual disability were excluded from the study. Additionally, women unable to read

in English and those women in custody of the Department of Children and Families or the Department of Youth Services were also excluded.

Recruitment and Data Collection

The study is a convenience sample of women from the Boston area enrolled from August 2014 until December 2014. Study staff used a standardized script to obtain verbal informed consent from the patient prior to administration of the survey (Appendix A). Waiver of parental consent was not required for minors as women in Massachusetts are lawfully allowed to make decisions relating to reproductive health at age 16. Research assistants were present during periods of high eligible patient volume (12pm-11pm daily) as determined by the previous experience of the study author (A.K.).

Women completed the survey in private rooms and if accompanied by a parent, or guardian, he or she was asked to step outside while the patient completed the survey. Any study participant who wished to give her parent(s)/guardian(s) information about the study, was provided a printed study information sheet (Appendix B).

Survey Instrument

A twenty-question paper questionnaire was administered (Appendix C). The survey instrument was piloted with 10 women to confirm face validity. The questionnaire provides information on patient demographics, primary care usage, contraceptive usage,

willingness to discuss or start contraception in the PED, and sexual and reproductive history.

Data Analysis

We performed a cross-sectional analysis of the questionnaire data collected from a total of 384 participants. Descriptive statistics were computed for study participants. Demographic characteristics for current LARC and non-LARC users were compared using chi-squared for categorical variables, student's t-test for continuous variables, and logistic regression for multivariate analyses. Fischer's Exact tests and Mann-Whitney U tests were used when appropriate. Odds ratios were also calculated. All factors that were significant in bivariate analysis were included in multivariate analysis. P Values and 95% CIs were used to describe statistical significance. All data was pre-coded and entered by research assistants using Microsoft Excel 2011 for Mac version 14.4.4. Data analysis was performed using SPSS software Statistics 20.0 (SPSS Inc., Chicago, IL).

RESULTS

Of the 384 women who completed the survey, 330 provided sufficient information for inclusion in our analysis of current LARC usage. Only 15.8% of women (52/331) reported current usage of a LARC method, 57.7% (30/52) used IUDs and 42.3% (22/52) used implants. LARC user characteristics were similar to those of the study population as a whole: the mean age was 19.2 years, 64% identified as African American, 44.2% had attended some college or received a 2 year college education (Associate's degree), 39.5% had parents who had completed high school, 44.0% planned to complete a 4 year college degree, 53.1% presented to the PED for a Gynecological/ Genitourinary or Gastrointestinal complaint, 86.5% indicated having a PCP, 79.2% had seen their PCP in the past year, 66.0% had no previous history of STI, and 63.3% were nulliparous (Table 1). The race of baseline respondent characteristics was divided into Black/African American, White/Caucasian, and Asian or Mixed/Other because of the very small proportion of Asian survey respondents and the high number of mixed race respondents (Table 1). Respondents were included in the Mixed/Other category if they marked multiple races (Black/African American, White/Caucasian, and/or Asian) or if they chose Other. The most commonly specified other race was Hispanic/Latina (17) with an additional 15 respondents specifying Cape Verdean.

Table 1: Baseline Respondent Characteristics

		Frequency (%)		
		Current LARC Users n=52	Current Non-LARC Users n=278	Total Population n=330
Age, mean		19.2 ± 1.4	19.1 ± 1.5	19.2 ± 1.5
Ethnicity				
	Hispanic/Latina/Spanish	18 (34.6)	66 (24.1)	85 (26.1)
Race				
	Black/African American	32 (64.0)	144 (54.5)	177 (56.0)
	White/Caucasian	3 (6.0)	44 (16.5)	47 (14.9)
	Asian or Mixed/Other	15 (30.0)	78 (29.2)	93 (29.3)
Level of Education				
	Less than high school	17 (32.7)	85 (31.6)	103 (31.8)
	High School Graduate or GED	12 (23.1)	101 (37.1)	113 (34.9)
	Some College but no degree or 2-year college degree (Associate's Degree)	23 (44.2)	85 (31.3)	108 (33.3)
Parent Level of Education				
	Less than high school	5 (9.6)	34 (14.8)	39 (14.3)
	High School Graduate or GED	17 (39.5)	89 (38.7)	106 (38.8)
	Some College but no degree or 2-year college degree (Associate's Degree)	13 (30.2)	47 (20.4)	60 (22.0)
	4 year college graduate (BA, BS) or Graduate/Professional School	8 (18.6)	60 (26.1)	68 (24.9)
Planned Level of Education				
	High School Graduate or GED or 2-year college degree (Associate's Degree)	9 (18.0)	52 (21.2)	61 (20.7)
	4 year college graduate (BA, BS)	22 (44.0)	115 (47.3)	138 (46.8)
	Graduate or Professional School	19 (38.0)	77 (31.4)	96 (32.5)
Chief Complaint*				
	Gynecological/Genitourinary	9 (19.1)	44 (17.4)	58 (16.8)
	Gastrointestinal	16 (34.0)	71 (28.1)	97 (28.1)
	Other	26 (55.3)	151 (59.7)	207 (53.8)

*Participants were permitted to list multiple chief complaints

Table 1 continued: Baseline Respondent Characteristics

	Current LARC Users n=52	Current Non-LARC Users n=278	Total Population n=330
Has Primary Care Provider			
Yes	45 (86.5)	229 (84.5)	274 (84.8)
No	7 (13.5)	42 (15.5)	49 (15.2)
Last time saw PCP			
Within the past year	38 (79.2)	194 (78.9)	232 (78.9)
A year or more ago	10 (20.8)	52 (21.1)	62 (21.1)
Previous History of STI			
Yes	17 (34.0)	84 (31.5)	101 (31.9)
No	33 (66.0)	183 (68.5)	216 (68.1)
Gravidity			
0	31 (63.3)	188 (69.1)	219 (68.2)
1	12 (24.5)	43 (15.8)	55 (17.1)
2 or more	6 (12.2)	41 (15.1)	47 (14.6)

Bivariate analysis comparing LARC to non-LARC users showed no significant difference in age, race, ethnicity, parental education, educational aspirations, primary care usage, gravidity, and STI history between the two groups. Non-LARC users were defined as all women not using LARC including women using SARC (condoms, OCPs, contraceptive patch, vaginal ring, or the shot) as well as those not using contraception (abstinence, withdrawal, or none). Odds of current LARC use based on age, race, ethnicity, parental education, educational aspirations, primary care usage, gravidity or STI history also did not significantly differ (Table 2). The race of respondents was further combined for bivariate analysis because of the low number of respondents indicating White/Caucasian race only. The participant's education level was not evaluated in bivariate analysis as it was highly correlated with participant age. Logistic regression was

not performed, as there were no significant differences between current LARC users and non-LARC users.

Table 2: Unadjusted Odds Ratios of Current LARC Use

Table 2: Unadjusted Odds Ratios of Current LARC Use			
		Odds Ratio	95% CI
Age			
	16-17	Reference	
	18-19	1.626	0.652-4.056
	20-21	1.152	0.462-2.868
Ethnicity			
	Hispanic/Latina/Spanish	1.693	0.896-3.201
	Non-Hispanic	Reference	
Race			
	Black/African American	1.484	0.793-2.774
	White/Caucasian, Asian, or Mixed/Other	Reference	
Parent Level of Education			
	Less than high school	Reference	
	High School Graduate or GED	1.299	0.444-3.796
	Some College but no degree or 2-year college degree (Associate's Degree)	2.07	0.680-6.3
	4 year college graduate (BA, BS) or Graduate/Professional School	1.037	0.321-3.348
Planned Level of Education			
	High School Graduate or GED or 2-year college degree (Associate's Degree)	Reference	
	4 year college graduate (BA, BS)	1.096	0.472-2.543
	Graduate or Professional School	1.426	0.599-3.395
Has Primary Care Provider			
	Yes	1.179	0.498-2.791
	No	Reference	
Last time saw PCP			
	Within the past year	1.019	0.476-2.180
	A year or more ago	Reference	
Previous History of STI			
	Yes	1.122	0.592-2.128
	No	Reference	

Table 2 continued: Unadjusted Odds Ratios of Current LARC Use

	Odds Ratio	95% CI
Gravidity		
0	Reference	
1	1.692	0.804-3.562
2 or more	0.887	0.348-2.266

DISCUSSION

Though we predicted that LARC users presenting to an urban PED would have similar characteristics as women presenting to family planning clinics and women included in large national surveys, we found our participants differed from national studies such as the NSFG (Nation al Survey of Family Growth), CDC YRBS (Youth Risk Behaviour Surveillance System), and Guttmacher Institute as well as the Contraceptive CHOICE Project in age, race, ethnicity, and gravidity (Dempsey et al., 2012; Peipert et al., 2011; Xu et al., 2011). Participants of our study tend to be younger, and more diverse: higher proportions of our participants identify as ethnically Hispanic or racially African American or Mixed-Race (Table 1). Additionally, our participants have lower gravidity, though we expect this is related to their younger age (Table 1). The parental education of our participants was slightly higher than in the NSFG, though in each study the most common education level is high school or GED. Other studies did not record participants' educational aspirations or primary care usage; therefore, we are unable to compare our results. The population differences can be explained in part by our different setting and profile of chief complaints; we are a large urban PED without direct affiliation to a

children's hospital, and unlike family planning clinics, only a small proportion of our population, 19.1%, present with gynecological or genitourinary issues (Table 1).

At 15.8%, the current LARC usage documented by our study is three times higher for this age group than previously documented by local and national surveys (Branum & Jones, 2015; Finer et al., 2012; Kann et al., 2014). We believe this dramatic difference in current LARC usage could be attributed to a variety of policy and attitudinal factors. Our institution has several policies that reduce barriers to LARC access: same-day appointments and walk-in appointments for LARC placement are available and some providers are trained and amenable to placing the sub-dermal implant in the PED. Other policies, such as the requirement for the provision of no-cost contraception under the Affordable Care Act (ACA), decrease the financial barriers to LARC uptake. As our institution is located in Massachusetts, two events may account for our higher rates of LARC usage: firstly, considerable Medicaid expansion occurred in 1997 and thus access to no-cost contraception was expanded and secondly, An Act Providing Access to Affordable, Quality, Accountable Health Care was passed in 2006 which also increased contraceptive coverage, though co-pays were still required (Conaboy & Kotz, 2011; Holahan & Blumberg, 2006). All current data includes the period prior to national ACA implementation; thus, with the changes specific to Massachusetts, we find that this may contribute to the high rates of LARC usage we documented in our study population. Further research is needed to determine if the high rate of LARC uptake seen here in our PED will be true of the rest of the nation several more years after full implementation of the ACA.

Practice guidelines for the placement of LARC have also changed: LARC's are considered first-line contraception for sexually active adolescents by major professional organizations of American physicians (ACOG, AAP, and AAFP), with the first being adopted in 2012 by ACOG. The changes in professional regulations, insurance coverage of contraception, and provider education may translate to a greater willingness on the part of providers to place LARC in nulliparous young women. As women tend to adopt the type of contraception used by their peers and are unlikely to use methods with which they are familiar, LARC usage may continue to increase as more women have social contacts using LARC and are more educated about these methods (Carter, Bergdall, Henry-Moss, Hatfield-Timajchy, & Hock-Long, 2012; Spies et al., 2010).

Our study faces some limitations, as it was conducted in just one urban PED and is a convenience sample, the generalizability of our results may be limited. However, this novel population is also a strength: many young women use the ED as their source of primary care and a large urban PED has not yet been the subject of other studies aiming to characterizing current usage of LARC.

The high rate of LARC usage in our population is encouraging for the uptake of LARC by young women nationally, but especially because women of color and those who have experienced discrimination have historically been less likely to use LARC than white women (Dehlendorf et al., 2014; A. R. Dempsey et al., 2012; Kossler et al., 2011). As we found no significant differences between young women currently using LARC and those not using LARC, we believe that all young women desiring contraception should be counseled about the benefits of LARC without emphasis race, ethnicity, education,

primary care usage, gravidity or sexual history. Continuing to increase the education of both providers and patients will be crucial to ensuring all young women have access to the most effective forms of contraception.

APPENDIX A Study Script

If parent(s) are in the room with the patient.

My name is XXXXXX
I am a member of the research staff here at Boston Medical Center.

We are conducting a research study about reproductive health and birth control. Discussions about an adolescent's reproductive health are confidential, or talked about in private, without parents in the room during medical visits. We usually have young women complete this survey in private. Are you interested in being in this study? Would you (parent) mind stepping out of the room?

(If the patient indicates that she would like her parent to stay in the room, or doesn't mind her parent staying in the room, they may do so.)

We are doing this study to understand the contraceptive, or birth control, needs of young women aged 16 to 21 years who come to our Emergency Room. The 20-question survey will take about 5 to 10 minutes to complete. The survey is anonymous, meaning you will not write your name or any other information that could identify you. Your decision to do the survey is voluntary. Your care will not change if you choose to participate or not.

Please read the top page of the survey that explains in more detail what I just explained. You may give your parent(s) an information sheet describing the study and your participation of the study, if you would like.

If parent(s) are not in the room with the patient.

My name is XXXXXX
I am a member of the research staff here at Boston Medical Center.

We are doing this study to understand the contraceptive, or birth control, needs of young women aged 16 to 21 years who come to our Emergency Room. The 20-question survey will take about 5 to 10 minutes to complete. The survey is anonymous, meaning you will not write your name or any other information that could identify you. Your decision to do the survey is voluntary. Your care will not change if you choose to participate or not.

Please read the top page of the survey that explains in more detail what I just explained. You may give your parent(s) an information sheet describing the study and your participation of the study, if you would like.

If adolescent declines participation:

Thank you very much for your time.

APPENDIX B Guardian Information Sheet

Birth Control and Sexual Health

What is the research study that my daughter has volunteered for?

Your daughter has volunteered to participate in a research study that lasts just for the period of time she is visiting the Pediatric Emergency Department at Boston Medical Center. State of Massachusetts guidelines indicate that minors can provide their own consent or permission, without parental input, for health-care related decisions regarding matters of reproductive health. Along these lines, your daughter was asked if she would be willing to fill out a research questionnaire about questions regarding reproductive health choices. The survey is strictly anonymous. No identifying information is provided on the survey, meaning that it will be impossible for anyone to know who the answers belong to.

What is the study about?

This is a research study focusing on adolescents' and young women's thoughts about birth control and their sexual health. The study is being conducted at Boston Medical Center. The purpose of this study is to find out more about adolescents' and young women's contraceptive needs, including whether or not young women may desire contraception from the emergency department. The hope is that your daughter's participation will ultimately help improve medical care. About 300 women between the ages of 16 to 21 are being asked to take part in this study.

What will my daughter be doing?

We are asking young women to complete an anonymous questionnaire with 20 questions.

What happens to the information my daughter provides?

We will not record any identifying information. The completed anonymous questionnaires will be stored in a safe and secure location in a research study office at Boston Medical Center. Information from this study may be reviewed and photocopied by state and federal regulatory agencies such as U.S. Government's Office of Human Research Protection and the Institutional Review Board of the Boston University Medical Campus, which oversees the conduct of all human subject research at Boston Medical Center.

Who can I contact for more information?

The Institutional Review Board at the Boston University Medical Campus oversees all research studies at Boston Medical Center. Please contact them at 617-638-7207 or **medirb@bu.edu** if you have any questions about your daughter being a research subject in this study.

APPENDIX C Survey

Section A: Background Information

1. How old are you? _____ years old

2. Are you Hispanic, Latina or of Spanish origin?
- ☐ Yes
- ☐ No

3. What is your race/ethnicity? ***(Check all that apply.)***
- ☐ Black or African American
- ☐ White or Caucasian
- ☐ Asian
- ☐ Other: _____

4. What is the highest level of education you have completed?
- ☐ Junior high school
- ☐ Some high school
- ☐ High school graduate or GED
- ☐ Some college but no degree
- ☐ 2-year college degree (Associates degree)
- ☐ Other: _____

5. What is the highest level of education completed by your parent(s)?
- ☐ Less than high school
- ☐ High school graduate or GED
- ☐ Some college but no degree
- ☐ Don't know
- ☐ 2-year college degree (Associates degree)
- ☐ 4-year college graduate (BA, BS)
- ☐ Graduate or professional school

6. What is the highest level of education you plan to complete?
- ☐ High school graduate or GED
- ☐ 2-year college degree (Associates degree)
- ☐ Don't know
- ☐ 4-year college graduate (BA, BS)
- ☐ Graduate or professional school

7. Do you have a primary care physician (regular doctor)?
- ☐ Yes
- ☐ No ***(If no, skip to question 9B)***

8. When is the last time you saw your primary care physician (regular doctor)?
- ☐ Within the last year
- ☐ Between 1- 2 years ago
- ☐ Over 2 years ago

9. Have you ever talked about birth control options with your primary care physician (regular doctor) and/or a parent?

9A) Your doctor: ☐ Yes **9B) A parent:** ☐ Yes

☐ No ☐ No

10. What brought you to the ER today? (examples: sore throat, fever, abdominal pain):

_____

Section B. Sexual Health History and Birth Control

11. If you were being seen in the emergency room for a problem, even if that problem was not related to your sexual health, would you be open to learning about birth control?
    - ☐ Yes
    - ☐ No

12. Have you ever been sexually active with boys? (By this, we mean vaginal sex)
    - ☐ yes
    - ☐ no ***(If no, skip to question 15)***

13. What type of birth control are you using **now**? ***(Check all that apply.)***
    - ☐ Abstinence
    - ☐ Birth control pills, ring, or patch
    - ☐ Injectable (Depo- Provera shot)
    - ☐ IUD (Mirena, Skyla, Copper ParaGard)
    - ☐ Implantable (Implanon/Nexplanon)
    - ☐ Withdrawal method ("pulling out")
    - ☐ Condoms
    - ☐ None
    - ☐ Other: _____

Birth control in the **past**? ***(Check all that apply.)***
- ☐ Abstinence
- ☐ Birth control pills, ring, or patch
- ☐ Injectable (Depo- Provera shot)
- ☐ IUD (Mirena, Skyla, Copper ParaGard)
- ☐ Implantable(Implanon/Nexplanon)
- ☐ Withdrawal method ("pulling out")
- ☐ Condoms
- ☐ None
- ☐ Other: _____

14 A. Are you happy w/ your current method of birth control?
- ☐ Yes ***(If yes, skip to Question 15)***
- ☐ No ***(If no, continue to Question 14B)***

14 B. If no, why not? (examples: requires a doctor visit, irregular bleeding, weight gain, can't remember to take/use.)

---

15. If you could start or change to any type of birth control of your choice here in the emergency room, how likely would you be to start it today?

Unlikely		Neutral		Likely
1	2	3	4	5

16. Which birth control method(s) would you be willing to start or change to if it was offered to you here in the emergency room today. ***(Check all that apply.)***

- ☐ Birth control pills, ring, or patch
- ☐ Injectable (Depo- Provera shot)
- ☐ IUD (Intra uterine device: Mirena, Skyla, Copper ParaGard)
- ☐ Implantable (Implanon/Nexplanon)
- ☐ I'm happy with my birth control method and would not change to a different kind.
- ☐ None
- ☐ Other: _____

17. Have you heard of the implantable birth control device Nexplanon that goes under the skin in the upper arm
(previously known as Implanon), which is the size of a matchstick and lasts for 3 years)?

- ☐ Yes
- ☐ No ***(If no, skip to Question 19)***

18. How did you hear about Nexplanon? ***(Check all that apply.)***

- ☐ Friends, family
- ☐ Media (internet, magazines)
- ☐ Medical professional (School nurse, primary care doctor, nurse, clinic)
- ☐ Other _____

19. Have you ever been diagnosed with a STD (sexually transmitted disease)? (examples: gonorrhea, chlamydia, herpes, trichomoniasis)

- ☐ yes
- ☐ no

20. How many times have you been pregnant? _____ (list # of times pregnant)

Thank you for taking the time to complete this survey

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Yoo, S. H., Guzzo, K. B., & Hayford, S. R. (2014). Understanding the Complexity of Ambivalence Toward Pregnancy: Does It Predict Inconsistent Use of Contraception? *Biodemography and Social Biology*, *60*(1), 49–66. http://doi.org/10.1080/19485565.2014.905193

Zheng, S.-R., Zheng, H.-M., Qian, S.-Z., Sang, G.-W., & Kaper, R. F. (1999). A randomized multicenter study comparing the efficacy and bleeding pattern of a single-rod (Implanon®) and a six-capsule (Norplant®) hormonal contraceptive implant. *Contraception*, *60*(1), 1–8. http://doi.org/10.1016/S0010-7824(99)00053-0

Ziv, A., Boulet, J. R., & Slap, G. B. (1998). Emergency department utilization by adolescents in the United States. *Pediatrics*, *101*(6), 987–994.

CURRICULUM VITAE

HALEA KALA MEESE

2/16/1990
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Education

Master of Science, Medical Sciences. Expected May 2015
Boston University
Master's Thesis title: "Characteristics of Long Acting Reversible Contraception Users Presenting to a Pediatric Emergency Department"
Bachelor of Arts, Public Health. May 2012. Departmental Honors
University of California, Berkeley. Berkeley, California. Concentration in Infectious Diseases
Study-abroad term at *University of Ghana, Legon. Accra, Ghana.* July 2010-December 2010.
Honors Thesis Topic: "Economic Incentives to Improve Women's Reproductive Health: A Systematic Review"

Research Experience

Boston Medical Center Pediatric Emergency Department, Boston, MA 8/2014-Present
Graduate Research Assistant

- Conducted more than 100 surveys regarding contraception and sexual health with women ages 16-22
- Performed statistical analysis of data using SPSS
- Findings: current LARC usage in our population was 15.8%, about three times that documented in the most recent national studies

UC Berkeley School of Public Health, Berkeley, CA 8/2011-7/2012
Honors Candidate in Public Health

- Designed systematic literature review of economic incentives and their impact on women's reproductive health
- Systematically reviewed over 3,000 publications to determine eligibility for inclusion in study
- Participated in bi-weekly research group meetings with graduate students and professors discussing studies of in progress and other recently published work
- Findings: evidence available is too heterogeneous to detect an impact of economic incentives on women's reproductive health

Summer Undergraduate Research Fellowship, Berkeley, CA 6/2011-8/2011
Fellow

- Designed and conducted systematic literature review of demand side interventions for the prevention of mother to child transmission of HIV
- Findings: Insufficient evidence to determine impact (only one study met inclusion criteria)

Ridge Regional Hospital, Accra, Ghana 9/2010-12/2010
Independent Research: Out of Pocket Pre and Post-natal Expenditure of Women Living with HIV

- Designed study and questionnaire
- Conducted 45 minute patient interviews with HIV positive mothers with the aid of an interpreter

- Compiled and analyzed data**,** drafted final report on research findings
- Findings: Out of pocket expenditure, especially informal payments to health care providers, was less than previously documented at other Ghanaian health care facilities

Presentations and Publications

Poster presentation, Summer Undergraduate Research Fellow Conference, Berkeley California, August 2011.

Meese, Halea. (2011). Demand Side Interventions for the Prevention of Mother to Child Transmission of HIV. Berkeley Undergraduate Journal, 24(2). Retrieved from: http://escholarship.org/uc/item/48h0893f

Professional Experience

Cynthia Belgum D.D.S. Davis, CA 8/2012-6/2013

Administrative Assistant

- Patient intake and vital signs
- Coordinated patient care across dental offices
- Resolved payment disputes with insurance companies and mediated patient payment concerns

Emergency Medicine Scribe Systems, Sacramento, CA 10/2012-2/2013

Medical Scribe

- Documented patient encounters including history of present illness; review of systems; family, medical, and social history; and physical exam findings under the direction of emergency room physicians

Berkeley Pulmonary and Critical Care Medical Group, Berkeley, CA 6/2009-3/2012

Research Assistant

- Managed budgets for clinical trials using Microsoft Excel
- Organized scheduling for over 20 doctors working at separate sites
- Designed informational website for medical research
- Addressed concerns of pharmaceutical representatives and mediated payment concerns via phone, email and fax

MEDICOS Nicaragua (University of California, Davis School of Medicine) 5/2011-6/2011

Medical Interpreter/Translator

- Interpreted for medical students during patient interviews and procedures at local hospitals and community health outposts during a one month exchange program
- Bi-directional translation of video footage of interviews conducted with local health care personnel and community members used in educational course for medical residents

Imani Clinic (University of California, Davis School of Medicine), Sacramento, CA 6/2010-7/2010

Medical Interpreter

- Interpreted for medical students, physicians, and Spanish speaking patients at student run clinic
- Assisted with patient intake and vital signs, organizing of medical supplies and medical charts

Community Involvement

Physicians for Human Rights, Boston, MA 1/2014–Present
Student Leadership Board Member

- Organized advocacy events including film screenings, clinical skills workshops, and monthly journal clubs
- Collaborated with board members to draft asylum clinic proposal

Debate Mate USA, Cambridge, MA 1/2014–Present
Mentor

- Mentored middle school students during bi-weekly workshops on parliamentary debate and public speaking techniques in underserved Boston public schools
- Judged bi-yearly local and regional debate competitions

California Health Professional Student Alliance, Oakland, CA 5/2012–5/2013
Northern California Education Officer

- Provided monthly educational briefings to chapter members on current events and research
- Collaborated with 14 member statewide officer corps to plan statewide lobby day and single payer health care conference for 250 attendees

Berkeley Model United Nations, Berkeley, CA 9/2008–5/2012
Head Chair (2011 and 2012), Co-Chair (2009-2010)

- Moderated and elected topics of discussion for committees of 150+ high school students
- Coordinated committee responsibilities with two co-chairs
- Evaluated student performance and addressed student/adviser concerns during and prior to yearly conference

Health and Medical Apprenticeship Program, Berkeley, CA 1/2011-5/2012
Public Health 116 Assistant Coordinator and Teaching Assistant

- Planned and Moderated a weekly discussion on health and medical issues for of 20 undergraduate students
- Evaluated student presentations and written assignments
- Addressed student concerns regarding homework assignments and course credit for 600 student lecture

Awards and Honors

Summer Undergraduate Research Fellowship: 2011 (one of 40 at UC Berkeley)
California Masonic Scholarship: 2008-2012 (one of 20 in California)
NARFE (National Active and Retired Federal Employees Association) Scholarship: 2008 (one of 60 nationally)

Language and Experience Abroad

Languages English and Spanish (fluent), Arabic (basic), Twi (basic)
Experience Abroad 6 months work and study in Ghana, Professional experience in China, Nicaragua, Sierra Leone, and Honduras.

Personal

Interests Rock climbing and bouldering, Law and Public Policy, Yoga, Hiking, Travel, Cooking, and Downhill Skiing